$$y = \tan^{-1}(x^2-1)^{\frac{1}{2}} + \csc^{-1} x \qquad x>1$$

$$y' = 2x\cdot\tfrac{1}{2}(x^2-1)^{-\frac{1}{2}}\cdot\frac{1}{1+\left((x^2-1)^{\frac{1}{2}}\right)^2} + \frac{-1}{|x|\sqrt{x^2-1}}$$

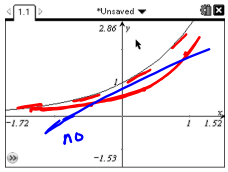
$$= \frac{x}{\sqrt{x^2-1}}\cdot\frac{1}{\cancel{1}+(x^2-\cancel{1})} - \frac{1}{|x|\sqrt{x^2-1}}$$

$$\frac{1}{x\sqrt{x^2-1}} - \frac{1}{x\sqrt{x^2-1}} = 0$$

Sep 28-9:28 AM

3.9a Derivatives of exponential functions

Sketch the derivative



$y = e^x$

$y' = e^x$

$$y' = \lim_{h\to 0}\frac{f(x+h)-f(x)}{h} = \lim_{h\to 0}\frac{e^{x+h}-e^x}{h}$$

$$\lim_{h\to 0}\frac{e^x\cdot e^h - e^x}{h} = \lim_{h\to 0} e^x\,\frac{e^h-1}{h}$$

$y' = e^x$

1

Oct 5-7:24 PM

$$\boxed{\frac{d}{dx}e^x = e^x}$$

$$\frac{d}{dx}e^u = e^u\cdot\frac{du}{dx}$$

$$\boxed{\frac{d}{dx}e^u = \frac{du}{dx}\cdot e^u}$$

Sep 28-9:49 AM

Find dy/dx if

$y = e^x\cdot e^{x^2}$

$y = e^{x+x^2}$

$y' = (1+2x)\,e^{x+x^2}$

$y = x^2e^x - e^{\sqrt{3x}}$

$y' = x^2\cdot e^x + 2xe^x - 3\cdot\frac{1}{2}(3x)^{-\frac{1}{2}}\cdot e^{\sqrt{3x}}$

$= x^2e^x + 2xe^x - \dfrac{3e^{\sqrt{3x}}}{2\sqrt{3x}}$

Oct 5-7:29 PM

The spread of the flu in a certain school is modeled by the equation

$y = \frac{100}{1+e^{3-t}}$ How fast is the flu spreading after 3 days?

$$y' = \frac{(1+e^{3-t})\cdot 0 - 100\cdot(-1)e^{3-t}}{(1+e^{3-t})^2}\Bigg|_{t=3}$$

$$= \frac{100e^0}{(1+e^0)^2} = \frac{100}{2^2} = 25\ \frac{\text{people}}{\text{day}}$$

on day 3 there are 25 new cases

Oct 5-7:45 PM

Derivative of $y = a^x$

$$y = 2^x$$

$$y' = \ln 2 \cdot 2^x$$

$$\boxed{\frac{d}{dx}a^u = \ln a \cdot a^u \cdot \frac{du}{dx}}$$

Oct 5-7:33 PM

At what point on the graph of $y = 2^t - 3$ does the tangent line have slope 21?

$$y' = 21$$

$$\ln 2 \cdot 2^t = 21 \qquad t = 4.9$$

$$2^t = \frac{21}{\ln 2}$$

$$\ln 2^t = \ln \frac{21}{\ln 2}$$

$$t \ln 2 = \ln \frac{21}{\ln 2}$$

$$t = \frac{\ln\left(\frac{21}{\ln 2}\right)}{\ln 2} \approx 4.9$$

Oct 5-7:34 PM

1.1 1.2 1.3 milk

A glass of cold milk from the refrigerator is left on the counter on a warm summer day. Its temperature y after sitting on the counter is $y=72-30\cdot(0.98)^t$

Oct 5-7:36 PM